Worksheet: Gravitation

West Bengal State Board · Class 9 · Science · 15 questions · 43 marks

Name: _____	Date: _____	Score: _____ / 43

Q1. State Newton's universal law of gravitation. *[1 mark]*

Q2. Find the weight of a 60 kg person on (a) Earth and (b) the Moon. (g_Earth = 10 m/s², g_Moon = 1.6 m/s²) *[1 mark]*

Q3. A box of weight 200 N is placed on a table. The base of the box has area 0.5 m². What pressure does the box exert on the table? *[2 marks]*

Q4. A ball is dropped from a height of 20 m. Find the time it takes to reach the ground. (g = 10 m/s²) *[2 marks]*

Q5. Why does an iron nail sink in water but a much heavier ship made of iron floats? *[2 marks]*

Q6. Two bodies of masses 100 kg and 200 kg are placed 10 m apart. Find the gravitational force between them. (G = 6.67 × 10⁻¹¹ N·m²/kg²) *[3 marks]*

Q7. A stone is thrown vertically upward with initial velocity 20 m/s. Find (a) the maximum height reached, (b) the time to reach the maximum height. (g = 10 m/s²) *[3 marks]*

Q8. Find the pressure exerted by sea water (density 1030 kg/m³) at a depth of 100 m. (g = 10 m/s²) *[3 marks]*

Q9. An object has mass 200 g and volume 50 cm³. Find its density and relative density. State whether it will sink or float in water. *[3 marks]*

Q10. Why is the value of g less at the equator than at the poles? *[3 marks]*

Q11. A cubical wooden block of side 10 cm and density 600 kg/m³ floats in water. (a) What fraction of the block is submerged? (b) What is the depth of the submerged part below the water surface? *[4 marks]*

Q12. Calculate the force of gravitational attraction between Earth (mass 6×10^{24} kg) and a person of mass 60 kg standing on Earth's surface. ($G = 6.67 \times 10^{-11}$, $R_{Earth} = 6.4 \times 10^{6}$ m). Show that the result is the person's weight on Earth. *[4 marks]*

Q13. A body is thrown vertically upward from a tower of height 25 m with velocity 15 m/s. Find the total time the body remains in the air before hitting the ground. (g = 10 m/s²) *[4 marks]*

Q14. A ship floats with 5 m of its hull below the water surface in fresh water. When it sails into sea water, the hull is now only 4.85 m below the surface. Why? (density_seawater = 1030 kg/m³, density_freshwater = 1000 kg/m³) *[4 marks]*

Q15. Why is it easier to swim in sea water than in fresh water? *[4 marks]*